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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/661,439	09/11/2003	Cheol Ho Shin	115003-003	7802

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EXAMINER

ZERVIGON, RUDY

ART UNIT	PAPER NUMBER
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1763

DATE MAILED: 10/06/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/661,439

Applicant(s)

SHIN ET AL.

Examiner

Rudy Zervigon

Art Unit

1763

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 September 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) 6-13 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 September 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☒ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 1/19/2005.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Applicant's election of Group I, claims 1-5 in the reply filed on September 8, 2005 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Drawings

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "plasma generator", "first reactive gas sprayers", "second reactive gas sprayers (61; Figure 5)", and "inert gas sprayers" must be shown or the features canceled from the claims. No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will

Art Unit: 1763

be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuse; Kimihiro (US 6,576,062 B2) in view of Mahawili; Imad (US 6,783,627 B1). Matsuse teaches PEALD (plasma enhanced atomic layer deposition) apparatus (Figure 5; column 3, lines 6-41) comprising: a housing (2; Figure 5; column 3, lines 6-41) including a reaction chamber (2; Figure 5; column 3, lines 6-41) in which a deposition reaction is performed; a rotary disk unit (5, 3; Figure 5; column 3, lines 6-41) installed in the housing (2; Figure 5; column 3, lines 6-41) and provided with a plurality of susceptors (4a-d; Figure 1,5; column 3, lines 6-41) for receiving wafers ("W"; Figure 5) thereon so as to move the wafers ("W"; Figure 5); a gas spray unit (60,61; Figure 5) mounted on the upper end of the housing (2; Figure 5; column 3, lines 6-41) above the rotary disk unit (5, 3; Figure 5; column 3, lines 6-41), and provided with first reactive gas sprayers (60; Figure 5), second reactive gas sprayers (61; Figure 5) and inert gas sprayers on a lower surface of a circular disk (60+61; Figure 5) for spraying respective gases into the housing (2; Figure 5; column 3, lines 6-41); a gas feed unit (20; Figure 1) connected to the gas spray unit (60,61; Figure 5) for supplying first and second reactive gases and a purge gas into the housing (2; Figure 5; column 3, lines 6-41); a gas exhaust port (14; Figure 1) formed around the rotary

Art Unit: 1763

disk unit (5, 3; Figure 5; column 3, lines 6-41) – claim 1. Applicant's claim requirement of gas identity as "reactive gas" and "purge gas" are claim requirements of intended use of the pending apparatus claims. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter, 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto, 136 USPQ 458, 459 (CCPA 1963); MPEP 2111.02).

Matsuse further teaches:

- i. The PEALD apparatus (Figure 5; column 3, lines 6-41) as set forth in claim 1, wherein the first reactive gas sprayers (60; Figure 5), the second reactive gas sprayers (61; Figure 5) are alternately arranged, and a purge gas exhaust port (14; Figure 1) is formed at the central portion of the gas spray unit (60, 61; Figure 5) – claim 2
- ii. The PEALD apparatus (Figure 5; column 3, lines 6-41) as set forth in claim 1, wherein each sprayer of the first reactive gas sprayers (60; Figure 5), the second reactive gas sprayers (61; Figure 5) made of a bar-shaped member with a predetermined length corresponding to the size of the wafer, includes through holes (60b; column 6, lines 54-61) for spraying the respective gases formed in the central portion thereof along a longitudinal direction, and is opposite one another with respect to the center of the gas spray unit (60, 61; Figure 5) – claim 3

Art Unit: 1763

Matsuse does not teach a plasma generator for generating plasma to excite the second reactive gas. Matsuse does not teach an additional gas sprayer, alternately arranged and made of a bar-shaped member, on a lower surface of the circular disk (60+61; Figure 5).

Matsuse further does not teach:

- i. The PEALD apparatus (Figure 5; column 3, lines 6-41) as set forth in claim 1, wherein the exciting of the second reactive gas by plasma generated from the plasma generator is performed at the outside or inside of the reactor, as claimed by claim 4

Mahawili teaches a remote plasma processing apparatus (Figure 6) including a remote plasma source (114, 116, 116a; Figure 6).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add Mahawili's remote plasma source to Matsuse's apparatus, and for Matsuse to optimize the length of Matsuse's third gas sprayer (13; Figure 5) onto Matsuse's circular disk (60+61; Figure 5).

Motivation to add Mahawili's remote plasma source to Matsuse's apparatus, and for Matsuse to optimize the length of Matsuse's third gas sprayer (13; Figure 5) onto Matsuse's circular disk (60+61; Figure 5) is for reducing operating temperature and stabilizing films already deposited as taught by Mahawili (column 3; lines 45-61). Further, it is well established that changes in apparatus dimensions are within the level of ordinary skill in the art. (Gardner v. TEC Systems, Inc. , 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied , 469 U.S. 830, 225 USPQ 232 (1984); In re Rose , 220 F.2d 459, 105 USPQ 237 (CCPA 1955); In re Rinehart, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); See MPEP 2144.04)

Art Unit: 1763


5. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuse; Kimihiro (US 6,576,062 B2) and Mahawili; Imad (US 6,783,627 B1) in view of Oda; Masao et al. (US 5,010,842 A). Matsuse and Mahawili are discussed above. Matsuse and Mahawili do not teach the PEALD apparatus (Figure 5; column 3, lines 6-41) as set forth in claim 1, further comprising electronic showerhead including arm installed at both sides of each of the second reactive gas sprayers (61; Figure 5), as claimed by claim 5

Oda teaches a plasma apparatus including an electronic showerhead (16; Figure 2, 4) including arms (16; Figure 2) installed at both sides of each of Oda's reactive gas sprayer (13a,b; Figure 3). It would have been obvious to one of ordinary skill in the art at the time the invention was made to add Oda's electronic showerhead to Matsuse's apparatus.

Motivation to add Oda's electronic showerhead to Matsuse's apparatus is for diffusing reactive gases as taught by Oda (column 3; lines 26-35).

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Rudy Zervigon whose telephone number is (571) 272.1442. The examiner can normally be reached on a Monday through Thursday schedule from 8am through 7pm. The official fax phone number for the 1763 art unit is (703) 872-9306. Any Inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Chemical and Materials Engineering art unit receptionist at (571) 272-1700. If the examiner can not be reached please contact the examiner's supervisor, Parviz Hassanzadeh, at (571) 272-1435.



10/3/5